PROGRAM	:	NATIONAL DIPLOMA *SOMATOLOGY*
SUBJECT	:	**ANATOMY AND PHYSIOLOGY 2**
CODE	:	**SAP 201**
DATE	:	EXAMINATION 13 NOVEMBER 2017
TIME	:	08:30 – 11:30
DURATION	:	180 MINUTES
WEIGHT	:	50:50
TOTAL MARKS	:	140

EXAMINERS	:	MS R. DANGAREMBIZI
MODERATORS	:	MR T.T NYAKUDYA
NUMBER OF PAGES	:	09 PAGES

INSTRUCTIONS	:	THIS QUESTION PAPER MUST BE RETURNED WITH THE MULTIPLE CHOICE ANSWER SHEET AND THE EXAMINATION SCRIPTS
REQUIREMENTS	:	2 x EXAMINATION SCRIPTS 1 x MULTIPLE CHOICE ANSWER SHEET

INSTRUCTIONS TO CANDIDATES:

1. THIS PAPER CONSISTS OF 2 SECTIONS.

   SECTION A CONSIST OF MULTIPLE CHOICE QUESTIONS THAT MUST BE ANSWERED ON THE **MULTIPLE CHOICE ANSWER** SHEET PROVIDED.

   SECTIONS B MUST BE ANSWERED IN THE **SEPARATE EXAMINATION SCRIPT** PROVIDED**.**

2. THIS QUESTION PAPER MUST BE RETURNED WITH YOUR EXAMINATION SCRIPTS.

SECTION A

Answer the following questions on the multiple choice answer sheet provided. Read the instructions carefully and select the most correct answer for each question.

Multiple choice questions removed

SUBTOTAL SECTION A: 50

SECTION B

Answer this section in a SEPARATE script. Ensure that you number your answers exactly as the questions are numbered.

QUESTION 1 - ENDOCRINE

1.1 Provide **ONE** function for each of the following hormones **AND** name the specific gland from which it is secreted. (14 x ½ = 7)

1.1.1. Calcitonin
1.1.2. Oxytocin
1.1.3. Antidiuretic hormone
1.1.4. Prolactin
1.1.5. Follicle-stimulating hormone
1.1.6. Aldosterone
1.1.7. Insulin

1.2 List any **SIX** short-term stress responses to adrenaline or epinephrine. (6 x ½ = 3)

[10]

QUESTION 2 – REPRODUCTIVE SYSTEM

2.1 Explain any **FOUR** functions of testosterone. (4 x 1 = 4)

2.2 Name the **THREE** layers of the uterus (3 x ½ = 1½)

2.3 Use **Figure 1** (overleaf) to answer the following questions:

2.3.1 Name the hormones labelled **A**-**C** and processes **D**-**E** in Figure 1 (5 x ½ = 2½).

2.3.2 What are the effects of the following hormones on the endometrium?
2.3.2.1 Oestrogen (1)
2.3.2.2 Progesterone (1)

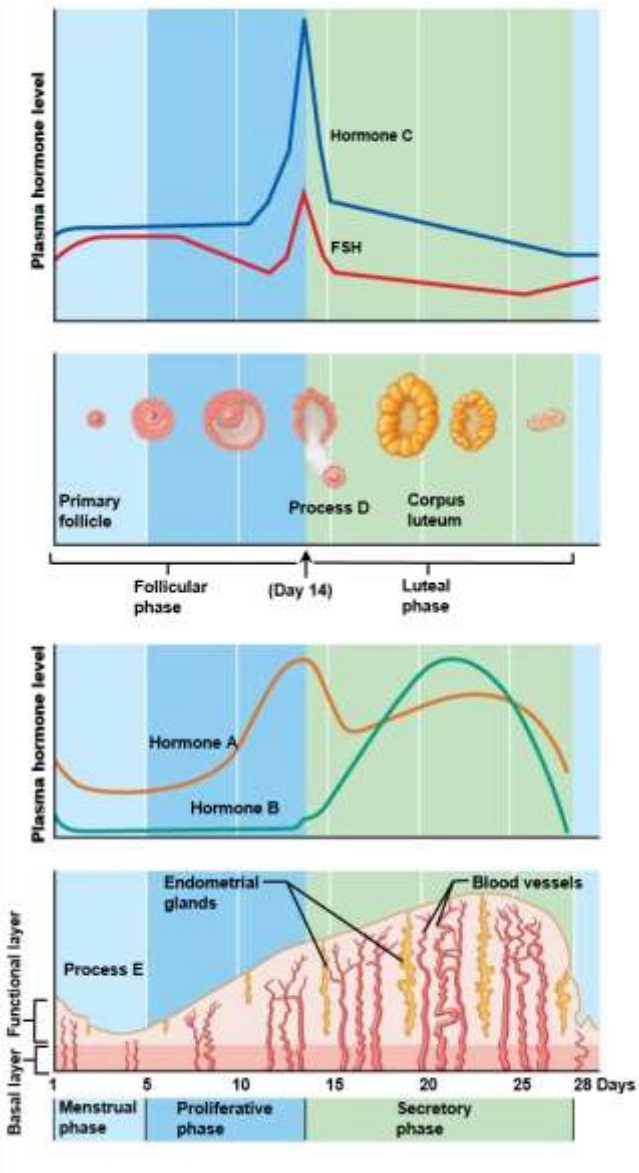

Figure 1: Hormonal function in the ovarian and menstrual cycles

[10]

QUESTION 3 – NERVOUS SYSTEM

3.1 Describe the events that lead to the transmission of an impulse across a synapse. (8 x ½ = 4)

3.2 Regarding cerebrospinal fluid (CSF):

3.2.1 Name the structure that produces CSF. (½)

3.2.2 Name the structures that reabsorb CSF. (½)

3.2.3 Name any **TWO** functions of the CSF. (2 x ½ = 1)

3.3 List the components of the brainstem, and name **ONE** function of each. (3 x 1 = 3)

3.4 You are alone at home late in the evening, and you hear an unfamiliar sound in your backyard, and you suddenly feel scared. Your body will mount a flight or fight response to help you cope with this rather frightful situation.

3.4.1 Which **division** of the autonomic nervous system controls the fight or flight response? (½)

3.4.2 Name the neurotransmitter released at the target organs. (½)

3.4.3 What is the effect (increased, decreased, no effect) of this division on:

a) heart rate (½)

b) respiratory rate (½)

c) blood glucose concentration (½)

d) digestion (½)

e) blood pressure (½)

f) defecation (½)

3.5 Use the diagram below, showing the different brain waves from an electroencephalogram (EEG), to answer the following questions.

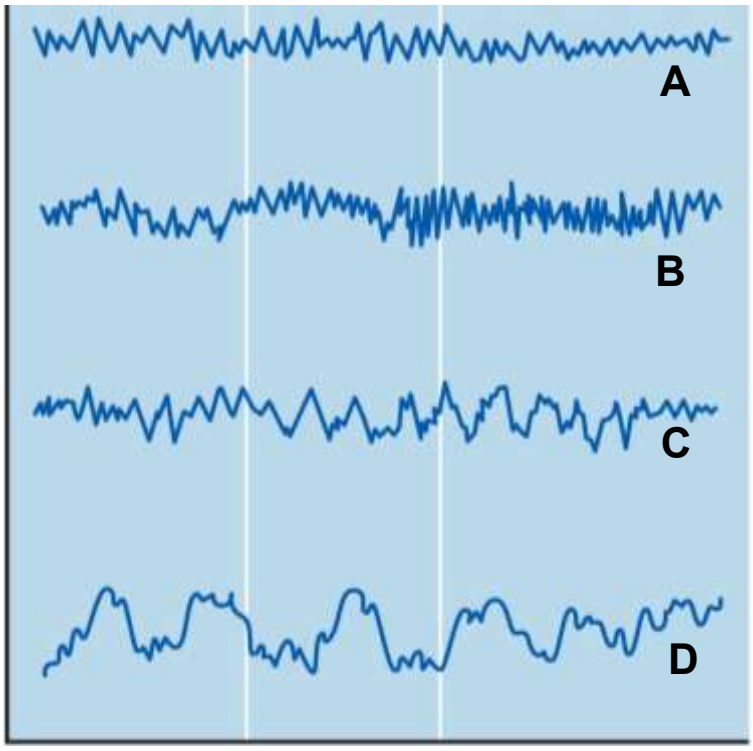

Figure 2: EEG tracing of brain activity

3.5.1 Label brain waves **A**-**D**. (4 x ½ = 2)

[15]

QUESTION 4 – SENSES

4.1 Name **FOUR** different functional categories of receptors and give an example of what types of stimuli they detect. (8 x ½ = 4)

4.2 Name **TWO** special senses that use chemoreceptors and state where the receptors are located. (4 x ½ = 2)

4.3 Define the following terms:

4.3.1 Tonic receptor. (1)

4.3.2 Receptor field. (1)

4.4 State whether each of the following statements is **TRUE** or **FALSE**.

4.4.1 The sclera is also called the sensory tunic. (½)

4.4.2 The ciliary body is a smooth muscle structure to which the lens is attached. (½)

4.4.3 The function of the auditory tube is to transmit sound vibrations. (½)

4.4.4 The bony labyrinth is located deep within the temporal bone just behind the eye socket. (½)

[10]

QUESTION 5 - BLOOD

5.1 Name the **THREE** types of formed elements found in whole blood, and provide **ONE** function for each type mentioned (6 x ½ = 3)

5.2 Choose the type of anemia from the word list below that best fits the descriptions that follow.

hemorrhagic	aplastic	haemolytic
iron-deficiency	sickle-cell	pernicious

5.2.1 genetic effect leading to abnormal haemoglobin. (½)

5.2.2 sudden excessive bleeding. (½)

5.2.3 lack of vitamin B12. (½)

5.2.4 destruction of the bone marrow. (½)

5.3 Complete the table below showing the four classes of blood types. You need only write the question number and your answer. (6 x ½ = 3)

BLOOD TYPE	ANTIGEN	ANTI-BODIES
A	5.3.1	Anti-B
B	B	5.3.2
AB	5.3.3	5.3.4
O	5.3.5	5.3.6

5.4 Identify any **FOUR** characteristics of white blood cells. (4 x ½ = 2)

[10]

QUESTION 6 - HEART

6.1 Provide labels for **A**-**H** shown in **Figure 3** below. (8 x ½ = 4)

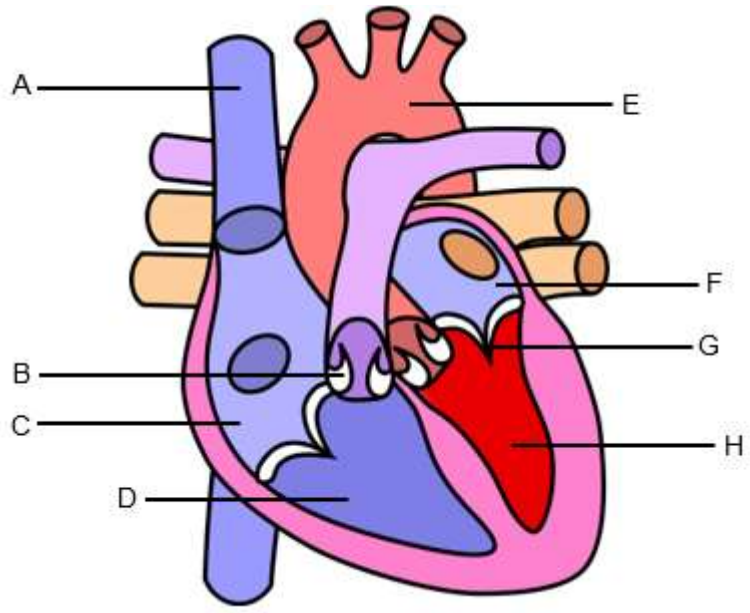

Figure 3: The heart

6.2 Identify the effect that each of the following will have on heart rate. (4 x ½ = 2)

6.2.1 being frightened

6.2.2 adrenalin (epinephrine)

6.2.3 exercise

6.2.4 parasympathetic nervous system

6.3 List the **THREE** major waves of an electrocardiogram (ECG) and name the **main** electrical event associated with each wave. (6 x ½ = 3)

6.4 State the cause for each of the following:

6.4.1 first heart sound. (½)

6.4.2 second heart sound. (½)

[10]

QUESTION 7 – BLOOD VESSELS

7.1 Determine whether each of the following statements are **TRUE** or **FALSE**. (4 x ½ = 2)

7.1.1 Arteries have valves that allow blood to flow in one direction only.

7.1.2 Capillaries have a tunica media and tunica intima.

7.1.3 Veins have thicker walls than arteries.

7.1.4 Larger arteries have an internal elastic lamina surrounding the tunica intima.

7.2 Use a diagram to show the forces acting on a capillary. (6 x ½ = 3)

Include or label the following:

a) different ends of a capillary.

b) pressures acting at each end of a capillary.

c) fluid movement at each end of a capillary.

[5]

QUESTION 8- THE LYMPHATIC AND IMMUNE SYSTEMS

8.1 Match the lymphatic organ in Column A to the correct statement in Column B.

(4 x ½ = 2)

Column A	Column B
8.1.1 Peyer's patches	A) produces hormone's that function in programming certain lymphocytes
8.1.2 thymus	B) found in the pharynx
8.1.3 spleen	C) found in the small intestine
8.1.4 tonsils	D) destroys worn out red blood cells
	E) part of the large intestine

8.2 Identify the **TWO** major components of the lymphatic system and give **ONE** function for each (4 x ½ = 2)

8.3 Identify the **TWO** major branches of the immune system and name **THREE** components found in each. (8 x ½ = 4)

8.4 Determine whether each of the following statements are **TRUE** or **FALSE**.(8 x ½ = 4)

8.4.1 Natural killer cells do not depend on specific antigen recognition.

8.4.2 The primary humoral response is faster, more prolonged and more effective than the secondary humoral response

8.4.3 Antibodies passing from a mother to fetus is a type of naturally acquired passive immunity.

8.4.4 Getting a flu vaccination is an example of an artificially acquired active immunity

8.4.5 Antibodies can inactivate pathogens by agglutination and precipitation only.

8.4.6 Helper T cells enhance the ability of macrophages to phagocytize pathogens

8.4.7 High body temperatures, as is the case when one has a fever, is important is increasing the speed of tissue repair,

8.4.8 Memory T cells kill pathogens by inserting perforins into the foreign cells.

8.5 Complete the following paragraph regarding the inflammatory response. You need only write down the question number and your answer. (8 x ½ = 4)

Inflammation is triggered when body tissues are injured, since injured cells release inflammatory chemicals such as (**8.5.1**) and (**8.5.2**). These chemicals have two major effects on the surrounding blood vessels. Firstly they cause blood vessels to (**8.5.3**), which results in the heat and (**8.5.4**) associated with inflammation. The resulting heat is beneficial, however, since it increases the (**8.5.5**) of cells, which speeds up their repair. The second effect of inflammatory chemicals on blood vessels is that they cause capillaries to become (**8.5.6**), resulting in pain and (**8.5.7**). A fibrin barrier is formed when (**8.5.8**) proteins enter the area.

8.6 Name **TWO** advantages of mild to moderate fever. (2 x ½ = 1)

8.7 Fully describe the process of phagocytosis. (6 x ½ = 3)

[20]

SUBTOTAL SECTION B: 90

TOTAL MARKS: 140